research, and others deal with various aspects of science descriptively. Such a society is a centre of beneficial influence, for it encourages investigation, affords facilities for the communication of facts and ideas, and promotes the friendly intercourse which broadens the views and sympathies of workers in different fields.

INCREASING interest in physical chemistry is shown by the fact that Prof. Walker's "Introduction to Physical Chemistry" (Macmillan), which was published towards the end of 1899, is already in its second edition. The book, which contains a full discussion of the chief principles of modern physical chemistry and shows their application to ordinary laboratory chemistry, has already been noticed in these columns (vol. lxii. p. 76, May 1900). Among other new matter in the new edition are accounts of "Berthelot's method for determining exact molecular weights from the limiting densities of gases, Traube's volume researches, and the position of the recently-discovered atmospheric gases in the periodic system."

IN the current number of the *Berichte*, Messrs Pictet and Rotschy give an account of the isolation of three new alkaloids from tobacco. Up to the present only a single organic base, nicotine, has been found in tobacco. In most plants producing alkaloids several bases usually occur together, and as it appeared unlikely that the tobacco plant should prove exceptional in this respect, a large quantity of tobacco extract was worked up, with the result that three new bases were discovered, to which the names nicoteïn, nicotellin and nicotimin are given. Of these, the last is associated with the crude nicotine, with which it is isomeric, differing, however, in being a secondary base and forming a nitrosamine by means of which it can be separated from the nicotine, in spite of the fact that it is present in very small amount in the crude base. The nicoteïn contains two atoms and the nicotellin four atoms of hydrogen less than nicotine.

THE additions to the Zoological Society's Gardens during the past week include a Patas Monkey (*Cercopithecus patas*) from West Africa, presented by Mr. H. Plange; a Diana Monkey (*Cercopithecus diana*) from West Africa, presented by Mrs. Yorke; a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mr. W. K. Edwards; a Common Otter (*Lutra vulgaris*), British, presented by Mr. W. Radcliffe Saunders; a Maximilian's Aracari (*Pteroglossus wiedi*) from Brazil, presented by Mrs. J. Rose; a Common Viper (*Vipera berus*), British, presented by Mr. G. Leighton; two Spanish Cattle (*Bos taurus*) from Spain, a Black-faced Kangaroo (*Macropus melanops*) from Tasmania, a Yellow-footed Rock Kangaroo (*Petrogale xanthopus*) from South Australia, a Grevy's Zebra (*Equus grevyi*) from Southern Abyssinia, three Zebus (*Bos indicus*) from India, two Nubian Goats (*Capra hircus*) from Nubia, five four-horned Sheep (*Ovis aries*) from St. Kilda, two Somali Ostriches (*Struthio molybdophanes*) from Somaliland, deposited; a Kestrel (*Tinnunculus alaudarius*), British, presented by Mr. F. Layer.

OUR ASTRONOMICAL COLUMN.

THE SPECTRUM OF NOVA PERSEI.—Prof. Vogel, in a recent communication (*Sitzber.* d. k. Akad. der Wiss. zu Berlin, March 21, xvi.), gives the results of a discussion of the Potsdâm observations of Nova Persei. Prof. Vogel considers that the spectrum can only be explained on the hypothesis of Wilsing. The immense perturbations in the star give rise to great differences of pressure in the layers of the materials composing the Nova, and these differences account not only for the presence of the bright and dark lines, but their great breadth. Prof. Vogel does not think that there is any reason to assume that the apparent great displacement of the dark lines is the consequence of a large motion deduced on the principle of Doppler. This displacement he accounts for on the supposition of the overlapping of the broad dark band over the bright band, the great pressure of the substance giving the bright band being more strongly developed on the red side, thus allowing the dark band to appear more prominent on the violet side.

STONEHENGE AND OTHER STONE CIRCLES.

TWO interesting papers on stone circles, by Mr. A. L. Lewis, have recently been published by the Anthropological Institute. One dealing more particularly with the stone circles of Scotland occurs in the *Journal* of the Institute (vol. xxx. New Series, vol. iii. 1900), and the other, on the damage recently sustained by Stonehenge, appears in *Man*—the monthly record of anthropological science published under the direction of the Institute. We reprint the latter paper, with the two illustrations accompanying it, and are glad to acknowledge the courtesy of the Institute in permitting us to do so. And here it will not be out of place to remark that both the *Journal* and *Man* are full of papers and notes of interest to every one devoted to the study of the human race in its many aspects. When one considers how little encouragement is given to the science of anthropology in this country, it is really astonishing to see the large amount of excellent material published under the auspices of the Anthropological Institute. The U.S. Bureau of Ethnology have funds to publish magnificent volumes showing the results of ethnological investigations carried on by its officers, but here there is no similar department for the preparation and distribution of such contributions to science, and anything that is done represents the result of private efforts for the advancement of natural knowledge. Even if no assistance is given to systematic anthropological inquiries in our colonies and dependencies, every facility ought to be provided for the publication of facts obtained by observers interested in the characteristics and customs of the races of men.

Mr. Lewis describes, in the *Journal* already mentioned, the observations made by him of stone circles in various parts of Scotland. The condition of some of these monuments of antiquity is deplorable, many of the stones having been shifted and used for all kinds of purposes. At Clava, for instance, we notice that one stone has been shifted to be parallel with a road running across the circle, and another has been placed to form the end of a stone wall. From an examination of a large number of stone circles in Scotland, Mr. Lewis concludes that they may be divided into different types each of which has its centre in a different locality. The types are (1) the Western Scottish type, consisting of a rather irregular single ring or sometimes of two concentric rings. (2) The Inverness type, consisting of a more regular ring of better-shaped stones, surrounding a tumulus with a retaining wall, containing a built-up chamber and passage leading to it, or a kist without a passage. (3) The Aberdeen type, consisting of a similar ring with the addition of a so-called "altar-stone" and usually having traces of a tumulus and kist in the middle. There is reason to believe that most of the circles of these three types were used for burial, if, indeed, that were not their chief purpose, but as there is evidence that all have not been so used, it cannot have been their only purpose. In addition to these three types of circles, there are what Mr. Lewis calls sun and star circles, with their alignments of stones, and apparently proportioned measurements. The stone circles of England appear to refer to the sun and stars more frequently than those of Scotland, where, however, more similar circles may yet be found. The Stonehenge group of stones seems almost to form a class by itself, and Mr. Lewis's description of it, reprinted below from *Man*, describes the present condition of this unique monument.

"The end of the nineteenth century has been signalised by—amongst other things—the fall of a part of Stonehenge, a misfortune which may not be without its compensating advantage if it should be the cause of the necessary measures being taken to preserve what is left of this unique monument in an intelligible condition.

"Stonehenge, it will be remembered, consists of a number of comparatively small stones standing in the form of a horse-shoe with the open end to the north-east, outside which were five "trilithons," or sets of two upright stones, each supporting a huge cross-piece; these were the largest stones of all, and only two sets of them remain complete, the last great change at

Stonehenge having been the fall of one of them in January 1797. Outside these was a circle of small stones, and outside these again a circle of larger upright stones, joined at the top by cross stones; both these circles are so defective, especially towards the south-west, that it has been doubted whether they ever were complete. It is one of the uprights of this outer circle (marked A on the plan—No. 22 on Petrie's plan) that has now fallen inward, carrying with it the capstone which connected it with the adjoining stone, and which has been broken in two by striking in its fall the remains of the trilithon which fell in 1797.

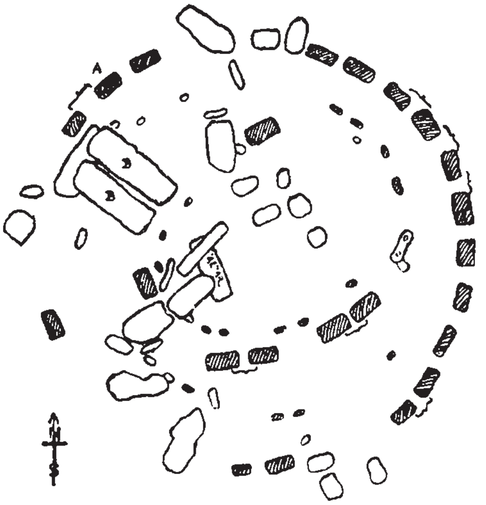

FIG. 1.—Plan of Stonehenge. A, Stone now fallen. BB, Stones which fell in 1797.
(*Reproduced from "Man."*)

"It is, perhaps, fortunate that these stones have fallen instead of the remaining stone of the central trilithon, the downfall of which has long been expected on account of its leaning position, an occurrence which, if not prevented, will cause much more damage than has been caused for centuries, and the practical question for archæologists is what is to be done to prevent it? Of course, no one advocates "restoration" in the sense of adding new stones to supply the places of those which have disappeared; but, inasmuch as the exact original position of almost every existing stone is perfectly obvious, and inasmuch as exact surveys have been made and published both by Sir Henry James on behalf of the Ordnance Survey,[1] and by Prof. Flinders Petrie,[2] there should be no objection to setting the leaning stones upright, so as to prevent them falling and breaking themselves and others, and to setting up those that are quite fallen, except those that are too much broken to be capable of being joined together. Such fragments should be left where they are, as also should any the precise original position of which cannot be ascertained. Next comes the question of keeping the stones in their position when they have been restored to it; and the best way to do this would be to dig out the whole interior down to the solid chalk, underpinning the stones while the work was going on, and to fill it up with concrete. In the digging out it might be expected that some relics would be found which might throw light on the date if not on the purpose of the monument; but the objection will no doubt be made that future generations might think that the concrete was part of the original work. This would be less likely to happen if the concrete were covered for its better preservation with half an inch of the best asphalte, such as is used in paving the London streets, under which boxes with documents might be buried for the benefit of any future excavators.

"If it were possible to keep things as they are, it might be preferable from an artistic point of view to do so, but it is not possible. If something be not done to prevent them further falls will happen, and where will be the poetry in a shapeless heap of broken stones?

"It must, however, be remembered that Stonehenge, though an object of national concern, is private property."

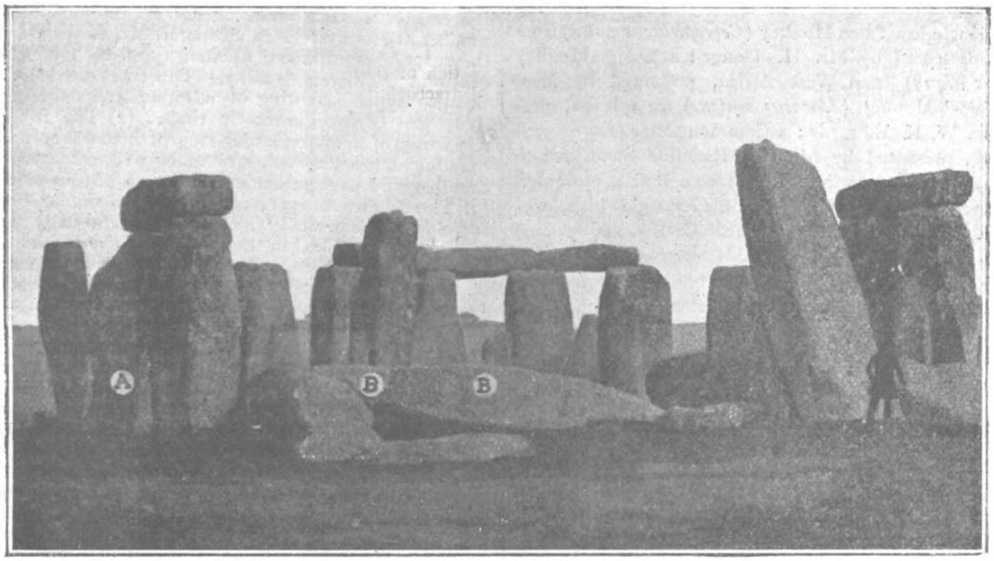

FIG. 2.—View of Stonehenge from the west. A, Stone now fallen. BB Stones which fell in 1797.
(*Reproduced from "Man."*)

A plan of Stonehenge is given in the *Times* of Tuesday, April 9, with a description of the condition of the monument and the natural and other causes which threaten to do mischief to it. To protect the monument, Sir Edmund Antrobus is prepared to erect around it, at his own cost, a wire fence 1500 yards in total length.

This course is recommended by the Society of Antiquaries, the Wiltshire Archæological Society, and the Society for the Protection of Ancient Monuments, and the suggestion has the approval of the county council, the district council, and the parish council of Amesbury. The societies further recommend the diversion of a grass driving road which now cuts across the earthwork, without prejudice to any legal question.

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[1] "Plans and Photographs of Stonehenge and of Turnsuchan in the Island of Lewis." 4to. Ordnance Survey: Southampton, 1867.

[2] "Stonehenge: Plans, Descriptions and Theories." 4to. London: Stanford, 1880.

To prevent other stones from falling it is suggested by the societies mentioned that the trilithon which has slewed round and also a leaning-stone be first examined with a view to maintaining them in safety. It is understood that no excavation beyond what is absolutely necessary will be allowed. This examination will show what can be done and ought to be done with all the standing Sarsens. It is advised that the monolith and lintel, which fell three months ago, be replaced, the companion Sarsen being made safe against the effects of the fall. Further, the societies recommend the erection of the great trilithon which fell in 1797, the exact place of which is known. All the rest they would leave as it is, though in some cases the place of fallen stones is known with fair certainty. The questions of how best to fix more firmly in the ground the stones now standing, and how best to re-erect the two trilithons which have fallen in the last 104 years, is left to engineering experts.

A STUDENT'S DRUM RECORDER.[1]

THIS admirable instrument consists of five parts easily detachable, viz. (i.) an adjustable tripod, which carries on one foot (ii.) a steel bracket for the attachment of the appurtenances incident to an observation; and (iii.) a central adjustable rod so fashioned as to receive (iv.) the drum, the heads of which are widely perforated for purposes of manipulation; and (v.) a clockwork driver, which is keyed at two points for insertion into the head of the rod. The special novelty of the instrument lies in the driver, which is so constructed that when at work it and the drum are together rotated. The driver is, moreover, set in a metal framework supported upon three feet, upon which it rests when not in use, adequately protected. Its working parts are all exposed, and there are no accessories. The arbor of the spring-wheel above, and of the main driving-wheel below, are each so keyed as to fit into the head of the rod or axle, the former being intended for slow motion, the latter for quick. For one winding the drum will run at its most rapid rate for 12-13 minutes, at its slowest for 16-17, allowance being made for adjustment of the wings of the "fly," which as a whole can be itself easily removed to ensure the maximum obtainable speed. The instrument is a triumph of ingenuity and good workmanship, and we have nought but praise to accord it. To produce at little more than one-fourth the price of the conventional drum-recorder a substitute in efficiency its equal, is to deserve well of the scientific public. This drum supplies a want long felt by teachers, and is bound to become popular. We heartily wish it the success it deserves.

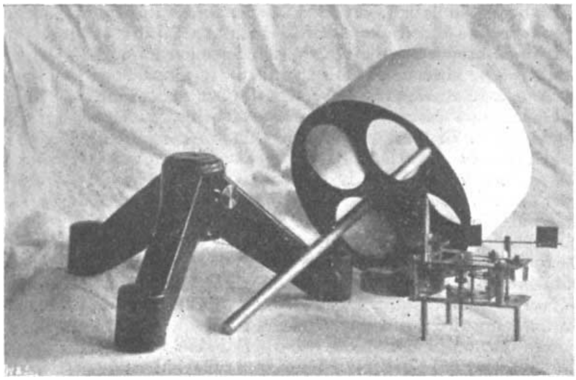

FIG. 1.—A Drum Recorder dismounted to show its parts.

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[1] By W. E. Pye and Co., "Granta Works," Mill Lane, Cambridge. Price 70s.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

MR. HERBERT F. ROBERTS, instructor in botany in Washington University, at St. Louis, Missouri, U.S.A., has been elected to the chair of botany in the Kansas State Agricultural College.

FOR the last two or three decades the engineering profession of Austria and Hungary spared no efforts to raise the technical institutions throughout those countries to the standard of the universities and to obtain for the former some of the more important academic privileges and powers which the latter have enjoyed since their establishment. The first aim of the leading members of the said profession was that the technical institutions should be authorised by the Government to grant degrees which, from an academic point of view, should be regarded as equal to those granted by the universities. We now notice, therefore, with satisfaction that their endeavours have been finally crowned with the desired success, and that the Minister of Public Instruction in Austria held, on April the 4th, a meeting which was attended by representatives of almost every technical institution in that country, and on this occasion announced the Government's intention of introducing a special statute by means of which the technical high schools should be empowered to confer the degree of Doctor of "Rerum Technicarum" upon students whose scientific attainments entitle them to that distinction. A special examining body will be appointed for that purpose, and some of the examiners, it is urged, should be at the same time members of the teaching staff in connection with some of the universities; the examinations, again, will be conducted on the same lines as those prescribed by the philosophical faculty of a university for the bestowal of the degree of Ph.D. The acquirement of that degree, however, will not—at least for the present—be made compulsory for all students of the technical academies; those, on the other hand, who attain it will, of course, be given special precedence in the case of Government appointments, which are usually accessible to all graduates of the recognised technical institutions by open competition.

SCIENTIFIC SERIAL.

Bulletin of the American Mathematical Society, March.—Prof. T. F. Holgate reports the December meeting of the Chicago section of the Society (December 27 and 28, 1900), and gives abstracts of several of the twenty-two papers which were read. In addition there is printed a paper by Prof. Hathaway on pure mathematics for engineering students, which was followed by an interesting discussion. The subject was treated under the heads (1) its utility; (2) methods of instruction; (3) the course; and (4) the instructor.—A paper read by Prof. Newson, at the February meeting, on indirect circular transformations and mixed groups, is supplementary to a paper entitled "Continuous Groups of Circular Transformations" (which appeared in the *Bulletin* for December, 1897), and deals with indirect circular transformations and the mixed groups obtained by combining these with the direct transformations. Prof. E. W. Brown reviews, at some length, the scientific papers of J. Couch Adams and the lectures on the Lunar theory, (vol. ii. Parts 1 and 2), edited by Profs. R. A. Sampson and W. G. Adams. Then follows, in English, the notice on M. Hermite, by M. C. Jordan, an address delivered at the meeting of the Paris Academy of Sciences, January 21, 1901.—The notes, as usual, cover a wide ground, and there is the usual portion appropriated to new publications.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 14.—"On the Ionisation of Atmospheric Air." By C. T. R. Wilson, F.R.S., Fellow of Sidney Sussex College, Cambridge.

In a preliminary note (*Camb. Phil. Soc. Proc.*, November 26, 1900) it was stated that a body, charged with electricity and suspended within a vessel containing dust-free air, loses its charge by leakage through the air. The same conclusion was arrived at by Geitel in a paper published a few days previously (*Physikalische Zeitschrift*, 2 Jahrgang, No. 8, pp. 116-119). The leakage